THE WEATHER ELEMENTS

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PRESSURE AND WINDS

Probably the most pronounced factor influencing the weather over the United States during February, 1924, was the persistence of high barometric pressure from the upper Mississippi Valley westward to the middle Plateau region. This was not due, as is usually the case, to the movement of high-pressure areas from the Canadian Northwest, as only a few important projections southward of the so-called polar front entered the United States during the month, but rather to high-pressure areas from the Pacific Coast States increasing somewhat in force after entering the continental United States and drifting slowly to the eastward.

As a result, a ridge of high barometric pressure was built up to the southward of the Canadian border, extending in a more or less east-west direction between Lake Superior and northern California. From this ridge southerly winds overspread the districts in the United States immediately to the northward, as well as the adjacent Canadian Provinces, carrying to those regions the warmth of more southern latitudes with resulting average temperatures in some localities the highest ever known in February.

On the other hand, the flow of air over the eastern and southeastern districts, due to the same cause, was mainly from northerly points, carrying the temperatures of these regions to latitudes materially southward and giving persistent and unseasonable cold over the Eastern and Southeastern States.

The most important anticyclone of the month, as affecting the temperature, moved into the Dakotas and Minnesota by the morning of the 4th, and rather sharp falls in temperature occurred in the Great Plains as far south as central Texas. Due to a storm passing northeastward toward the Great Lakes, the effects of this anticyclone in lowering the temperature were mainly felt to the southward of the storm center and cold weather persisted in the Southern and Southeastern States for a considerable period.

About the middle of the month another anticyclone entered the upper Missouri Valley and moved eastward, but important lowering of the temperature was confined mainly to the more northern districts. The latter half of the month was without anticyclones that materially lowered the temperature over extensive areas.

The cyclones of the month attained importance principally over the eastern portions of their courses and occurred mainly over the central and southern districts. One of the most extensive of these, particularly as to area covered and amount of precipitation, developed early in the month over the far Southwest, but in the main caused little precipitation until after reaching the middle Plains on the morning of the 3d. During the following two or three days it moved slowly eastward and northeastward, attended by snow or rain over the greater part of the country from the Mississippi Valley eastward. Over a considerable area from Oklahoma and Kansas northeastward to the upper Lakes there were heavy falls of snow and in portions of this area heavy glaze formed. High winds drifted the snow badly, causing much delay to transportation interests, and the extensive ice coating damaged overhead wires, trees, etc. To the southward of the storm center precipitation was mostly rain, heavy in some localities, and local winds of tornadic character occurred in a few localities, notably in northern Alabama, where some loss of life occurred.

On the morning of the 16th cyclonic conditions developed over the Southern Plains and moved eastward to the middle Mississippi Valley during the following 24 hours, and later the storm's influence extended to the middle Atlantic coast, although it appears to have lost its identity and probably merged later into another that advanced northeastward from the middle Gulf coast, which combined with a second low area moving southeastward from the upper Missouri Valley about the same time. A general combination of these had been accomplished by the morning of the 19th and rains and snows had fallen over the greater part of the country from the Great Plains eastward, continuing during the following 24 hours over the more northeastern districts.

The precipitation from this combination of storms was heavy over the Gulf and Atlantic Coast States and in portions of the Ohio Valley, and heavy snow fell from the Middle Atlantic States to New England. High winds and gales along the Atlantic coast and drifting snow with extensive glaze formation in parts of the affected area caused much delay to traffic of all kinds, and damage to overhead communications.

On the morning of the 24th threatening cyclonic conditions were noted over the west Gulf, and by the following morning rain had occurred in that section as well as over portions of the Southeast. This storm developed materially and at the end of the following 24 hours was central in the vicinity of Mobile, Ala., as a storm of considerable severity. It moved to the eastward of the Carolina coast by the 27th and thence to sea. Heavy rains occurred in connection with this storm over the Gulf and South Atlantic States, and considerable snow fell in the southern Appalachian Mountains and adjacent highlands.

Practically no important cyclones entered the United States from the north Pacific coast, a point of frequent origin for winter storms, and the entire country from the Rocky Mountains westward to the Pacific was unusually free from the severe storms usual to a winter month.

The mean sea-level pressures for the month were above the normal in all portions of the United States and Canada, as far as observations disclosed, save along the Atlantic coast from southern New England to northern Florida, the departures being large from Lake Superior westward to Oregon and northern California. Over the Atlantic coast districts the pressure averages were mainly slightly less than normal.

Compared with the preceding month, the pressure was nearly everywhere less, save from the Dakotas eastward to northern New England, generally over the central and eastern Canadian Provinces, and locally along the immediate Pacific coast. As a rule the pressure for February is less than for January over all parts of the country save the areas adjacent to eastern Lake Superior, and along the Pacific coast.

Severe local storms were limited to a few localities, mainly on the 4th, but winds were high over the middle Mississippi Valley and thence northeastward to the upper Lakes about the 4th to 5th and along the Atlantic coast on the 19th and 20th. High winds were much less frequent on the Pacific coast than is usually the case in February.

TEMPERATURE

The outstanding feature of the temperature survey for both the United States and Canada is the marked warmth that persisted so uniformly during the month from the Great Lakes westward and southwestward to the Pacific coast, and the less marked, but persistent coolness over the Eastern and Southeastern States.

From the Dakotas westward to the Pacific the month was mainly warmer than normal throughout, and in portions of Idaho, Oregon, and Washington every day of the month had temperatures above normal, while in adjacent States only from one to three days were cooler than normal. In portions of this area the monthly means were the highest ever known in February, and at a few points the maximum temperatures were likewise the highest of record so early in the year. On the other hand, the month was decidedly cold in New England and generally over the Atlantic and Gulf States, where in some localities, particularly in New England, temperatures were below normal nearly every day.

A notable feature of the temperature for the month as a whole was the absence of important day-to-day changes. This particular feature is commented on by the official in charge at Chicago, Prof. H. J. Cox, as follows:

> Attention is invited to a most unusual condition, embracing certain temperature features of the two successive months of January and February, 1924. The mean daily variability for January was 11.3°, the highest of record for any month whatever, while the mean for February was 3.4°, the lowest for any winter month, and among the lowest for any month of the year. Another feature of February was the low mean daily range of temperature. This was 8.9°, which is the lowest of record for any month, with the single exception of 8.4° for December, 1918.

This evenness of temperature was likewise noted at other points, both in the regions of persistent cold as well as in those of continued warmth.

The warmest periods of the month varied in different portions of the country, ranging from the 2d to 5th over the area extending from the Dakotas southeastward to the Middle Atlantic States; from the 12th to 14th, over most districts from the Rocky Mountains westward; about the 15th to 18th, over the Southeastern States; and from the 26th to 28th, over the northern tier of States from Minnesota to New England.

The highest temperature reported during the month, 95°, occurred on the 4th, at San Benito, Tex.

The coldest periods were 1st to 4th over most districts west of the Rocky Mountains; 5th to 9th, from Texas and Oklahoma eastward to the Middle Atlantic States; and 20th to 25th, from Montana and Wyoming eastward to the Great Lakes and portions of the Middle Atlantic States.

Freezing temperatures occurred in all the States of the Union, although the greater part of Florida and the extreme southern portions of the Gulf States and the immediate Pacific coast section had none.

The lowest temperature reported during the month, −35°, occurred at Humboldt in northern Michigan.

PRECIPITATION

Considering the country as a whole, the precipitation was deficient over probably more than two-thirds of the area, though the amounts received to eastward of the Great Plains were mainly sufficient for present needs.

Portions of Florida and the West Gulf States had local areas with more than the normal fall, and likewise in the Atlantic Coast States from the Carolinas to southern New England there were areas with amounts above normal.

From the Great Plains westward the precipitation was nearly everywhere deficient save in South Dakota and small portions of adjacent States, and in the far Northwest, where slight excesses occurred.

In most of the mountain regions of the West the light precipitation was due to a general deficiency of snowfall, which was nearly everywhere far less than normal. This was particularly the case in the central and southern portions of the area, where the monthly precipitation was frequently the least of record.

In California, where drought had persisted since the beginning of the season, February brought no material relief and at the end of the month less than 50 per cent of the normal precipitation for the season up to that time had been received. Similar conditions exist in Nevada, Utah, Arizona, and portions of adjacent States.

In the districts east of the Rocky Mountains precipitation was heaviest in eastern Texas, where amounts up to slightly more than 8 inches fell, and amounts nearly as large were reported locally in the other Gulf States. In the far West the greatest falls, nearly 25 inches, occurred near the Washington coast, while considerable areas in southern California, and the adjacent portions of Nevada and Arizona, had no precipitation during the entire month.

SNOWFALL

Over a considerable area, from the eastern portions of Colorado and Wyoming to the Great Lakes, there was generally more snow than usual in February, due mainly to the heavy falls attending the storm of the 3d to 5th over that region, and the storm of the 19th and 20th brought heavy snows from the southern Appalachian Mountains to New England. Over other areas east of the Rocky Mountains the snow during the month was mainly light.

From the Rocky Mountains westward the snowfall was mainly far less than normal, as stated previously, particularly in the mountains of California, and generally over the Plateau districts.

At the end of the month the stored snow in the mountains of California was far less than usual and in some sections probably less than ever known before.

Streams were at low stages and the prospects for an adequate supply of water for the coming dry season declined as the month progressed. In many other portions of the central and southern mountain States the supply of snow in the mountains at the end of the month ranged from less than one-half to as little as one-third of the normal.

At the end of the month the snow cover over the eastern half of the country had mainly disappeared save in the upper Lake region and from the mountain regions of Maryland northeast to New England. In the western mountain districts only the more elevated portions had a material covering.

RELATIVE HUMIDITY

Due to general warmth in the West and Northwest and absence of the usual amount of precipitation over large areas, the relative humidity for the country as a whole was less than the normal, the deficiencies in the far Southwest being unusually large. Over New England and generally in the Lake region the percentage of relative humidity was higher than normal.